

CORRUPTED MEMORY

Elizabeth Loftus has spent decades exposing flaws in eyewitness testimony. Her ideas are gaining fresh traction in the US legal system.

BY MOHEB COSTANDI

In the early hours of 9 September, 1984, a stranger entered Mrs M's California home through an open living-room window. Finding Mrs M asleep, he tried to rape her, but fled when other people in the house awoke. Mrs M described her assailant to the police: he was black, weighing about 170 pounds and 5'7" to 5'9" tall, with small braids and a blue baseball cap.

Officers cruising her neighbourhood spotted someone roughly matching that description standing beside his car a block away from the house. The man, Joseph Pacely, said that his car had broken down and he was looking for someone to jump-start it. But Mrs M identified him as her attacker and he was charged.

At Pacely's trial a few months later, memory researcher Elizabeth Loftus testified on his behalf. She told the jury how memory is fallible; how stress and fear may have impaired Mrs M's ability to identify her assailant, and how people can find it difficult to identify someone of a race other than their own.

Pacely was acquitted. "It's cases like this that mean the most to me," says Loftus, "the ones in which I play a role in bringing justice to an innocent person."

In a career spanning four decades, Loftus, a psychologist at the University of California, Irvine, has done more than any other researcher to document the unreliability of memory in experimental settings. And she has used what she has learned to testify as an expert witness in hundreds of criminal cases — Pacely's was her 101st — informing juries that memories are pliable and that eyewitness accounts are far from perfect recordings of actual events.

Her work has earned her plaudits from her peers, but it has also made her enemies. Critics charge that in her zeal to challenge the veracity of memory, Loftus has harmed victims and aided murderers and rapists. She has been sued

and assaulted, and has even received death threats. "I went to a shooting range to learn how to shoot," she says, noting that she keeps a few used targets in her office as a point of pride.

Now, the 68-year-old scientist's research is starting to bring about lasting changes in the legal system. In July last year, the New Jersey Supreme Court issued a ruling — based largely on her findings — that jurors should be alerted to the imperfect nature of memory and the fallibility of eyewitness testimony as standard procedure. Loftus is working with judges in other states to make such changes more widespread.

"What's going on now in America really is something of a revolution," says Martin Conway, a cognitive psychologist at City University London. Loftus' work, he says, has been "profoundly important" in shaping these changes.

MALLEABLE MEMORIES

Loftus says that her start in psychology was rudderless. As a graduate student in mathematical psychology at Stanford University in California, "I wasn't really captivated," she says. "I'd sit in the back of the seminars, kind of bored, writing letters to my Uncle Joe or hemming skirts, or whatever."

Eventually a social-psychology class piqued her interest and she began to study how word meanings are stored in the brain, and how people recall them. Still, something was missing. "One day I was having lunch with a cousin of mine," she says, "and I told her about our great discovery that people are faster at naming 'a bird that's yellow' than 'a yellow bird.'" Her cousin — unimpressed — joked about taxpayers' money being wasted. "That's when I decided I wanted to work on something that had more practical applications."

Loftus was casting about for a meaningful way to study memory

and get funding when a former Stanford engineer working for the US Department of Transportation said that his employer would probably pay for research into car accidents.

Following that lead, Loftus won funding in 1974 for a proposal to study witness accounts of accidents, and she soon published the first of several influential studies revealing the limitations of eyewitness testimony¹. She showed people film clips of car accidents and asked them to estimate the speed of the cars. The wording of the questions, she found, had a profound effect on the estimates. People who were asked, "How fast were the cars going when they smashed into each other?" gave higher estimates on average than those with whom the verb 'hit' was used. And those who were told that the cars had 'contacted' each other gave the lowest estimates.

Those asked about cars smashing into one another were more than twice as likely as others to report seeing broken glass when asked about the accident a week later, even though there was none in the video. "I realized that these questions were conveying information," says Loftus. "I began to think of it as a process of memory contamination, and we eventually called it the misinformation effect."

She went on to publish several other studies²⁻⁴ showing how memories can be contorted, and that the ability of eyewitnesses to identify suspects from photographs can be unreliable. Any description they might hear has the potential to influence who or what they think they saw.

Loftus was eager to translate these findings to the real world, and began consulting on legal cases to get "close up and personal" with witnesses. Her first case — of a woman accused of killing her abusive boyfriend — hinged on whether the woman had acted in self-defence or had committed premeditated murder. Eyewitnesses could not agree on how much time had elapsed between when the defendant had picked up the gun and when she had fired it: some said

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Elizabeth Loftus, see:
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it was seconds, others said minutes. Loftus cast doubt on the memory of the witnesses, and the woman was acquitted.

Loftus described the case, together with her research, in a 1974 article for *Psychology Today* magazine⁵. “Once that article came out, I started getting calls from all over the place,” she says. “From lawyers wanting me to work on their cases, and legal professionals wanting me to lecture at their meetings.”

Some of her trials have been high-profile — including that of the serial killers known as the Hillside Stranglers and the 1992 trial of the police officers indicted for beating construction worker Rodney King. She even consulted on a case involving a young law student named Ted Bundy, who was accused of kidnapping a woman in 1974. Bundy was convicted, only to escape. Recaptured in 1978, he eventually admitted to killing 30 people.

The possibility of aiding guilty people does not faze Loftus. “I haven’t had a situation where someone was acquitted because of my testimony and then went on to commit some awful crime,” she says. “I would feel horrible if that happened, but I’m only one small piece of a court case.” She is often compensated for her expert-witness work, earning up to US\$500 per hour, she says.

Nita Farahany, a bioethicist at Duke University School of Law in Durham, North Carolina, says that Loftus’s activism in the court is not unique, and that testifying on behalf of unpopular defendants is important. “It shows that she has tried to be truly impartial, and that her goal is to try to provide an accurate understanding of the science, no matter who is involved.”

Still, Loftus has drawn the line at some defendants, such as John Demjanjuk, who in 1988 stood accused in Israel of being ‘Ivan the Terrible’, a guard who operated gas chambers at the concentration camp Treblinka in Poland during the Second World War. Loftus, herself Jewish, declined to testify because she worried that it would upset family and friends.

The case led some to accuse her of double standards. But those criticisms were mild compared with the reactions that she would soon trigger in her most controversial legal work.

DIGGING UP THE PAST

In 1990, Loftus got a call from a California attorney defending George Franklin, whose daughter claimed that during therapy, she had recovered decades-old memories of him murdering her friend, Susan Nason. Loftus decided to consult for the defence team. “I thought it was pretty fishy and started looking into the literature,” she says. She found little convincing research to support the idea that traumatic memories could be repressed for years.

Franklin was convicted despite her testimony. He spent five years in prison before an appeals court reviewed and then overturned his conviction amid doubts over his daughter’s statements.

The courts went on to see a surge in cases

based on recovered childhood memories, fuelled in part by popular books and high-profile accusations. Loftus began to wonder whether it was possible to fabricate complex, believable memories. "I wanted to see if we could implant a rich memory of an entirely made-up event," she says. An idea eventually came to her as she drove past a shopping mall.

Working with a student, Jacqueline Pickrell, Loftus recruited 24 people and, with the cooperation of family members, presented them with four detailed accounts of events from their childhood. Three of the incidents had actually taken place, but the fourth — a dramatic account of being lost in a mall — was entirely concocted by Loftus and corroborated by the participants' relatives. One-quarter of the participants claimed to remember the false event⁶.

BATTLE GROUND

Loftus became convinced that well-meaning psychotherapists could inadvertently implant false memories into patients' minds, and her subsequent testimonies led to a row between therapists who believed their patients were recovering lost memories and researchers who thought something else was afoot. To try to settle these 'memory wars', the American Psychological Association (APA) commissioned an expert report about the subject, to be written by three memory researchers, including Loftus, and three clinical psychologists.

The groups could not agree, and each ended up writing a separate report. "It was very polarizing," says Stephen Ceci, a developmental psychologist at Cornell University in Ithaca, New York, who worked with Loftus on one of the reports.

There are ways in which traumatic memories of real events can be recalled after being buried for years, he adds, but without hard evidence, it is impossible to distinguish false memories from real ones in court. It is, therefore, possible that some claims of childhood abuse go unvindicated because of Loftus' testimony, and this is the cause of much of the hostility towards her.

Ross Cheit, a political scientist at Brown University in Providence, Rhode Island, started the Recovered Memory Project in 1995 to document and respond to what he says has been a one-sided debate. There are now more than 100 corroborated cases of recovered memory on his website (<http://blogs.brown.edu/recovered-memory>), he says, including some on which Loftus had consulted.

"Loftus is often on the losing side, and she's sometimes wrong in a spectacular way," Cheit says. Her testimonies, he adds, can be psychologically damaging for the victims. "If you're telling someone you think their memories are false, when they have corroborating evidence that they were abused, that's corrosive."

Loftus does not believe that Cheit's site corroborates recovered memories. "He might have some cases of people who didn't think about

their abuse for some time and were reminded of it, but as for actual repression, no," she says. "I cringe at the idea of hurting genuine victims, but when an innocent person is accused, we have a whole new set of victims, and I'm more horrified by an innocent person getting convicted than by a guilty person being acquitted."

But her testimonies and investigations into recovered memories have strained her professional relationships. Towards the end of 1995, two women filed formal complaints against Loftus with the APA. Lynn Crooks and Jennifer Hoult had won civil suits in cases involving recovered memories of childhood sexual abuse, and both claimed that Loftus had distorted the facts of their cases in articles and interviews. Loftus resigned from the APA and critics speculated that she had caught wind of the complaints and left before a formal investigation could take place. But Loftus chalks her resignation up to political disagreements, saying she knew nothing of the complaints at the time.

In 1997, Loftus and several colleagues began to dig into a published case study describing an anonymous subject, 'Jane Doe', who had apparently recovered a repressed memory of childhood abuse⁷. They found information that cast doubt on her account, but before they could publish, Doe contacted the University of Washington in Seattle, where Loftus was working, and accused the team of breaching her privacy.

The university confiscated Loftus's files, put her under investigation for nearly two years and prevented her from publishing. She was eventu-

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ally cleared, and published the work⁸ in 2002. The next year, however, Doe sued Loftus and her collaborators for fraud, invasion of privacy, defamation and causing emotional distress.

It was at around that time that Loftus moved to the University of California, Irvine. The Jane Doe case was eventually settled in 2007, when the Supreme Court of California dismissed all but one of the charges and Loftus agreed to pay a nuisance settlement of \$7,500. "It was such a stressful time, but I can't really say it was detrimental overall," says Loftus.

Her work has now moved from trying to affect single cases to pushing for broader changes in the legal system. Loftus has been working with Pennsylvania trial judge Jeannine Turgeon to compile a set of guidelines similar to those instituted in New Jersey last year. They instruct jurors that memory "is not like a video recording" and ask them to consider the many factors that can alter memories, such as the presence of a weapon, which can draw attention

away from the perpetrator's face.

"This has the potential to be really important," says Farahany. "Using cutting-edge research to undercut the idea that memory is as stable and precise as people believe it to be can really help us get to a place where we have better truth-seeking in criminal cases," she says.

Loftus wants to go further. Almost every stage of the legal process — from the identification and questioning of suspects to cross-examination of eyewitnesses in the courtroom — is prone to error. In a line-up, for example, police officers can influence identification, but this can be avoided if someone who does not know the identity of the prime suspect conducts the line-up (see *Nature* **453**, 442–444; 2008). "I'd like to see this kind of thing being implemented, and to keep educating people about the workings of memory," says Loftus.

MIND CONTROL

Meanwhile, her research has shifted into new controversial waters. Taking on board the lesson that memories can be manufactured, she has been investigating the possibility of using those memories to modify behaviour^{9,10}. "We've shown that you can plant a memory of getting sick eating particular foods as a child," she says, "and we can get people thinking they got sick drinking vodka, so they don't want to drink as much of it later on."

There is no evidence that any of this will successfully transfer from the lab to the real world. Even if it does, it would violate therapists' code of conduct, and could have unforeseen consequences.

"Lying to children is a slippery slope that makes me uncomfortable," says Judy Illes, a neuroethicist at the University of British Columbia in Vancouver, Canada. "Can't we alter their behaviour in a positive way, instead of using subterfuge?" But Loftus dismisses the concerns, suggesting that even if therapists cannot do it, parents might want to. "Parents lie to their kids all the time, about Santa Claus and the tooth fairy. Would you rather have an unhealthy kid, or one with a few false memories?" ■

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1. Loftus, E. F. & Palmer, J. C. J. *Verb. Learn. Verb. Behav.* **13**, 585–589 (1974).
2. Loftus, E. F. *Cognitive Psychol.* **7**, 560–572 (1975).
3. Powers, P. A., Andriks, J. L. & Loftus, E. F. *J. Appl. Psychol.* **64**, 339–347 (1979).
4. Loftus, E. F. & Greene, E. *Law Hum. Behav.* **4**, 323–334 (1980).
5. Loftus, E. F. *Psychol. Today* **8**, 116–119 (1974).
6. Loftus, E. F. & Pickrell, J. E. *Psychiat. Ann.* **25**, 720–725 (1995).
7. Corwin, D. L. & Olafson, E. *Child Maltreat.* **2**, 91–112 (1997).
8. Loftus, E. F. & Guyer, M. J. *Skeptical Inquirer* **26.3** (2002). Available at go.nature.com/pr8jxp.
9. Bernstein, D. M., Morris, E. K., & Loftus, E. F. *Soc. Cognition* **23**, 11–34 (2005).
10. Clifasefi, S. L., Bernstein, D. M., Mantonakis, A. & Loftus, E. F. *Acta Psychol.* **143**, 14–19 (2013).